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Three Leucosiid Crabs of the Genus *Philyra* from Okinawa, the Ryukyu Islands, with Description of a New Species

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Abstract Three species of pebble crabs of the genus *Philyra* (Family Leucosiidae) are reported from estuary of the Oura River, Okinawa-jima, one of the main islands in the Ryukyu Islands. They are *P. iriomotensis* SAKAI, 1983, *P. nishihirai* sp. nov. and *P. taekoeae* TAKEDA, 1972. The new species is most close to *P. alcocki* KEMP from the Chilka Lake in the general areolation and granulation of the carapace, but readily distinguished from it by the different arrangement of vesiculate granules on the branchial regions.

In the summer of 1987, Dr. M. NISHIHIRA of the University of the Ryukyus collected many kinds of samples of crustaceans, mollusks and other invertebrates with aid of his students during the ecological survey of benthic animals at estuary of the Oura River, Okinawa-jima Island. Of them, three small, unusual pebble crabs referable to the genus *Philyra* were brought to the authors for identification. They were identified as two known species, *P. iriomotensis* SAKAI and *P. taekoeae* TAKEDA, and one new species which is to be described below under the name of *P. nishihirai* dedicated, with thanks, to Dr. Moritaka NISHIHIRA of the Department of Science, University of the Ryukyus.

All the specimens examined are preserved in the National Science Museum, Tokyo (NSMT).

Family Leucosiidae

Genus *Philyra* LEACH, 1817

Philyra iriomotensis SAKAI, 1983

(Fig. 1 A–C)

Philyra iriomotensis SAKAI, 1983, pp. 6 (in English volume), 29 (in Japanese volume), pl. 5 (C).

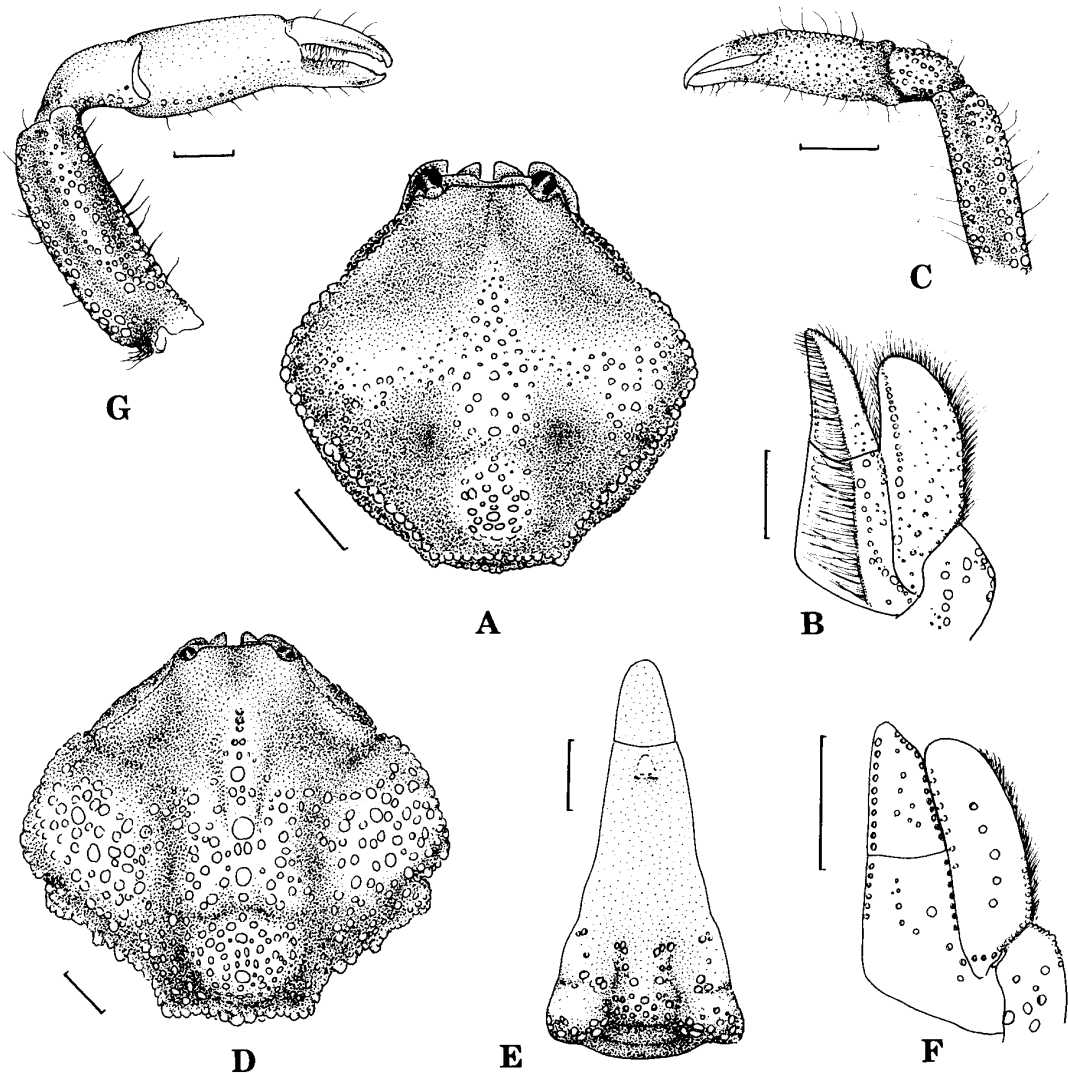


Fig. 1. *Philyra iriomotensis* SAKAI, ovig. ♀ (NSMT-Cr 10953) (A-C) and *P. taekoa* TAKEDA, ♂ (NSMT-Cr 10956) (D-G). A and D, carapace; B and F, left third maxilliped; C and G, cheliped; E, abdomen. Scales=1 mm.

An ovigerous female (NSMT-Cr 10953; 5.1 and 5.2 mm in length and breadth of carapace, respectively) at hand agrees in general with the original diagnostic description and diagrammatic figure of the carapace. According to the original description in both English and Japanese volumes, the carapace is longer than broad, but it is noted at present that the measurements are given by the original author as 5.0 mm in length and 5.5 mm in width.

The general formation of the carapace, with a narrow subhepatic facet at each side, is similar to that of the close congener, *Philyra taekoa* TAKEDA, but the dorsal surface of the carapace is not so strongly convex as a whole, with smaller granules on the mesogastric, branchial and cardiac regions. The third maxilliped is traversed by a

longitudinal line of long hairs from tip of the merus to basal part of the ischium. It is noted, however, that in the holotype female of *P. taekoeae* and the paratype female of the new species described later the third maxilliped is also provided with a similar line of hairs unlike in males. Therefore, this may refer to one of the sexual characters associated with female.

The original author described the male abdomen as being divided into six segments in Japanese volume and thus figured in the plate. This is unusual in the genus *Philyra*, and it is highly probable that the median three segments are really coalescent to each other, only with vestigial sutures.

Distribution. Originally reported from mud flat of mangrove area of the Kuira River, Iriomote Island in the southern Ryukyu Islands.

***Philyra nishihirai* sp. nov.**

(Fig. 2)

A male (holotype, NSMT-Cr 10954; 6.8 and 7.0 mm in length and breadth of carapace, respectively), and an ovigerous female (paratype, NSMT-Cr 10955; 7.6 and 8.0 mm in length and breadth of carapace, respectively).

Male (holotype). Carapace rhombic, almost as wide as long, or only slightly wider than long; dorsal surface strongly convex as a whole, smooth except for mesogastric and cardiac regions and a ridge of each branchial region, being fringed with a row of vesiculate granules except for frontal and supraorbital margins. Mesogastric part indicated anteriorly with a median line of several small granules and laterally with a line of vesiculate granules of good size directed toward each hepatic region; metagastric part with a cluster of vesiculate granules, being separated from cardiac region by a shallow transverse furrow. Cardiac region strongly raised, subtruncated dorsally, covered with a cluster of vesiculate granules. Branchial region provided with a ridge running from median part of posterolateral margin of carapace; its anterior or distal half longitudinal and posterior or proximal half oblique. Hepatic region feebly demarcated, its margin weakly convex and fringed with small granules; subhepatic facet well formed, rather concave so as to be narrow in dorsal view, with margin weakly convex and beaded with more than ten granules; anterior part of branchial margin or posterior part of anterolateral margin of carapace directed outward just behind hepatic margin, then changed its direction to lateral angle of branchial region or of carapace, which is rather angulated; posterior margin of branchial region or posterolateral margin of carapace beaded with a line of fused granules of good size, its median part being angulated and raised. Posterior margin of carapace weakly concave, with a small median protuberance and angulated lateral ends of both sides.

Frontal region weakly concave, and its margin weakly concave in dorsal view, with a small median protuberance.

Chelipeds not heavy, covered with small granules. Merus granulated along both anterior and posterior margins and on upper surface as a longitudinal belt. Carpus

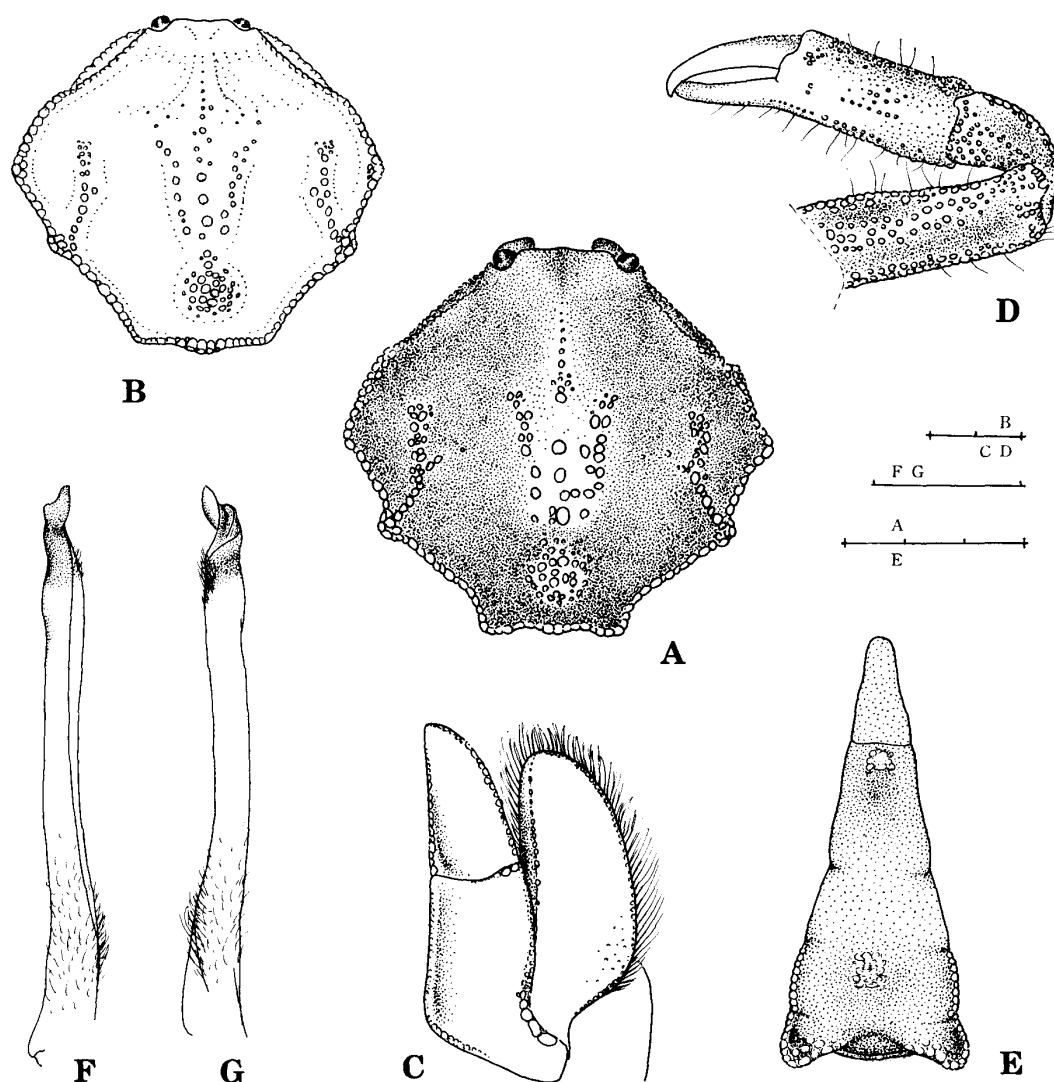


Fig. 2. *Philyra nishihirai* sp. nov., holotype ♂ (NSMT-Cr 10954) (A, C-F) and paratype ♀ (NSMT-Cr 10955) (B). A and B, carapace; C, left third maxilliped; D, right cheliped; E, abdomen; F and G, left first pleopod in abdominal and sternal views, respectively. Scales in mm.

smooth along its outer margin. Palm long and granulated along anterior and posterior margins and on median convex part of upper surface. Fingers one and half times as long as palm, narrowly gaped.

Ambulatory legs slender, smooth. Sternum rather concave as a whole, with thickened and granulated margins along bases of ambulatory legs. Abdominal fossa fringed with beaded granules along anterior two sternites.

Male abdomen long, with three pieces; proximal piece linear and mostly hidden under posterior margin of carapace; median piece prominent, with three vestigial incisions at each side, being provided with an obtuse tubercle covered with vesiculate

granules at terminal part; distal piece narrow, ca. 1/3 as long as median one.

First pleopod long, not curved, with twisted distal part, as represented in Fig. 2F, G.

Ovigerous female (paratype). The carapace is not much different from that of the holotype male, with quite same areolation and granulation, but the areolae are comparatively shallowly isolated and the lateral angle of the branchial region or of the carapace is only obtusely angulated as well as each lateral end of the posterior margin of the carapace. The third maxilliped is provided with a line of long hairs on the merus and ischium unlike in the case of the holotype male. The abdomen is composed of four pieces; the proximal two are short and wholly covered with vesiculate granules; the main piece is almost smooth except for small marginal spaces and also for median proximal and distal parts; the distal piece is rather long and ellipsoidal.

Remarks. The new species is referred to the species group having the carapace roughened with vesiculate granules on the gastric, cardiac and branchial regions. Most of the species in question are small and specifically characteristic in the areolation and granulation. In addition to the known species, some species of the genus *Ebalia* such as *E. malefactorix* KEMP and *E. scabra* DAI (in DAI *et al.*, 1986) may find better place in the genus *Philyra*.

This new species is most closely related to *Philyra alcocki* KEMP from the Chilka Lake. The general similarity is due to the smooth surface with sparse vesiculate granules on the restricted parts of the gastric, cardiac and branchial regions. The linear arrangement of the branchial granules instead of the granulated wide spaces of the branchial region is characteristic for these two species, but in *P. alcocki* two lines of granules running from the posterolateral margin of the carapace are united to each other at the mesobranchial part and directed forward as a longitudinal line.

***Philyra taekoa* TAKEDA, 1972**

(Fig. 1 D-G)

Philyra taekoa TAKEDA, 1972, p. 1, fig. 1; Sakai, 1976, pp. 113 (in English volume), 75 (in Japanese volume), fig. 63 (b, c).

A male (NSMT-Cr 10956; 7.5 and 8.0 mm in length and breadth of carapace, respectively) at hand agrees in general with the description and figures of the holotype female. The carapace is rhombic in outline, with the well-developed gastric, cardiac and branchial regions which are rather densely covered with vesiculate granules of good size. The mesogastric region is wide, longitudinally quadrate and separated from the branchial region by a transverse shallow furrow.

The male specimen at hand differs from the holotype female in the armature of the posterolateral and posterior margins of the carapace. In the male the posterolateral margin is more strongly angulated and roughened by larger granules behind the lateral angle of the branchial region or of the carapace; the posterior part of the posterolateral margin is rather strongly constricted in front of the lateral end of the posterior margin of the carapace, which is angulated and developed to the level of the median convexity

of the posterior border of the carapace. The small difference in the contour of the posterior half of the carapace may be referred to the difference in the sex.

The male first pleopod is figured by SAKAI (1976).

Distribution. Previously known from Amami-Oshima and Yoron Islands in the northern Ryukyu Islands.

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